

Appl. No. 10/702,181
Amendt. dated December 30, 2005
Reply to Office Action of October 28, 2005

Amendment to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

Please cancel claims 2, 3 and 4.

Claim 1 (currently amended): A performance enhancing break-in method for a proton exchange membrane fuel cell (12), the fuel cell including an anode electrode (14) and a cathode electrode (16) secured to opposed sides of a proton exchange membrane electrolyte (18), the method comprising the steps of:

- a. ~~cycling a potential of an electrode selected from the group consisting of the anode electrode (14) and the cathode electrode (16)~~ for a first electrode cycle by changing the potential of the selected electrode (14, 16) within a potential range of between 0.00 volts to 1.20 volts from a first potential within the range to a second potential within the range and then changing the potential of the selected electrode (14, 16) from the second potential back to the first potential while exposing the selected anode electrode (14, ~~16~~) to an inert gas and while exposing the ~~non-selected~~ cathode electrode (~~14,~~ 16) to a gas selected from the group consisting of a hydrogen containing gas, a reducing fluid reactant, and a mixture of a reducing fluid and an inert gas by lowering the potential of the anode

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- 25 electrode (14) within the potential range by first
 exposing the anode electrode (14) to the inert gas
 while exposing the cathode electrode (16) to the
 reducing fluid reactant, and then raising the
 potential of the anode electrode (14) within the
 potential range by exposing the anode electrode (16)
 to an oxidant reactant while continuing to expose the
 cathode electrode (16) to the reducing fluid reactant;
 and,
- 30 b. repeating the cycling of the potential of the ~~selected~~
 anode electrode (14, 16) for at least a second
 electrode cycle.

Claim 2 (canceled)

Claim 3 (canceled)

Claim 4 (canceled)

- 5 Claim 5 (previously presented): A performance enhancing
 break-in method for a proton exchange membrane fuel cell (12),
 the fuel cell including an anode electrode (14) and a cathode
 electrode (16) secured to opposed sides of a proton exchange
 membrane electrolyte (18), the method comprising the steps of:
- 10 a. cycling a potential of the cathode electrode (16) for
 a first cathode cycle by changing the potential of the
 cathode electrode (16) within a potential range of
 between 0.00 volts to 1.20 volts from a first cathode
 potential within the range to a second cathode
 potential within the range and then changing the

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potential of the cathode electrode (16) from the second cathode potential back to the first cathode potential while exposing the cathode electrode (16) to an inert gas and while exposing the anode electrode (14) to a gas selected from the group consisting of a hydrogen containing gas, a reducing fluid reactant, and a mixture of a reducing fluid and an inert gas;

- b. repeating the cycling of the potential of the cathode electrode (16) for at least a second cathode cycle;
- c. cycling a potential of the anode electrode (14) for a first anode cycle by changing the potential of the anode electrode (14) from a first anode potential within the potential range of between 0.00 volts to 1.20 volts to a second anode potential within the range and then changing the potential of the anode electrode (14) from the second anode potential back to the first anode potential while exposing the anode electrode (14) to an inert gas and while exposing the cathode electrode (16) to a gas selected from the group consisting of a hydrogen containing gas, a reducing fluid reactant, and a mixture of a reducing fluid and an inert gas; and,
- d. repeating the cycling of the potential of the anode electrode (14) for at least a second anode cycle.

Claim 6 (original) The method of claim 5, comprising the further steps of cycling the potential of the cathode electrode (16) by applying a direct electrical current to the cathode electrode (16) from a programmable direct current power source (80) to change the potential of the cathode electrode (16) from

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the first potential to the second potential, and then to change the potential of the cathode electrode (16) back to the first potential, and cycling the potential of the anode electrode (14) by applying a direct electrical current to the anode electrode
10 (14) from the programmable direct current power source (80) to change the potential of the anode electrode (14) from the first potential to the second potential, and then to change the potential of the electrode (14) back to the first potential.

Claim 7 (previously presented): The method of claim 5 further comprising the steps of cycling the potential of the cathode electrode (16) by lowering the potential of the cathode electrode (16) within the potential range by first exposing the
5 cathode electrode (16) to the inert gas while exposing the anode electrode (14) to the reducing fluid reactant, and then raising the potential of the cathode electrode (16) within the potential range by exposing the cathode electrode (16) to an oxidant reactant while continuing to expose the anode electrode (14) to
10 the reducing fluid reactant.

Claim 8 (currently amended): The method of claim 5, further comprising the steps of cycling the potential of the anode electrode (14) by lowering the potential of the anode electrode (14) within the potential range by first exposing the anode
5 electrode (14) to the inert gas while exposing the cathode electrode (16) to the reducing fluid reactant, and then raising the potential of the anode electrode (14) within the potential range by exposing the anode electrode (14) ~~(16)~~ to an oxidant reactant while continuing to expose the cathode electrode (16)
10 to the reducing fluid reactant.

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Claim 9 (previously presented): The method of claim 5, further comprising the steps of, after the cycling the potential of the cathode electrode (16) step and the cycling the potential of the anode electrode (14) step, calibrating performance of the fuel cell (12) by a performance calibration step by exposing the anode electrode (14) to the reducing fluid reactant and exposing the cathode electrode (16) to an oxidant reactant, then closing a primary load switch (78) to connect a primary load (74) to the anode and cathode electrodes (14, 16) for a predetermined duration, then opening the primary load switch (78) after the duration, and then repeating the performance calibration step a predetermined number of repetitions.

Claim 10 (canceled)

Claim 11 (canceled)